REMARKS/ARGUMENTS

Claims 1, 5 and 6 have been rejected under 35 USC 102(b) as being anticipated by Eiermann (5,493,871). The examiner has stated that the disclosed invention consist of a flow system for an air conditioner and comprising: a reheat coil 14 located downstream of a cooling coil 54 which is located upstream of a pre-cooling coil 12. It is further stated that Eiermann discloses a thermal heat source 16 for hot fluid (H.F.), a pump 18, a control valve 20, a bypass conduit (B.P.) and a controller 30 for modulating control valve 20. Moreover, the examiner presents that the said control valve can inherently operate as a bypass/hot water control valve by means of controller 30 and whereby the said control valve is inherently apt to control gas bubbles within hot water.

It is believed the control valve as disclosed in the cited art will produce bubbles as would a pump. There is no precooling bypass valve as claimed and disclosed in the instant invention. There is also no check valve buffer element as disclosed and claimed. The elements of the Eiermann cited art are not disposed as disclosed and claimed and several elements are not included as in the instant invention. The Eiermann art is related to run-around enhanced air conditioning systems that have been in limited use since the late 1930's. These systems never became popular because of two primary obstacles. First, the susceptibility to failure due to free air bubbles in the system, causing air binding of the run-around loop. Secondly, their inherit incompatibility with other known air conditioning systems, such as, multistage hydronic heating systems, run-around reheat systems, dual fuel heat pumps, and combination systems which are tied into the domestic potable water system. The use of a check valve buffer and precool bypass valve as disclosed and claimed in claim1 solves these two distinct problems.

Check valve buffer. Until recently, the run-around loops of run-around enhanced air conditioning systems were closed systems, their loops were not opened to boiler loops, hydronic heating systems, or domestic potable water systems. Even though one of the main problems with run-around systems, either closed, or open has been free air bubbles. Opening the run-around loops to the outside caused this problem to be greatly enhanced. This problem is due to the injection of heated

fluid into the loop or pressure imbalances caused by actions of the domestic water system. Injection of heated fluid, and then its rapid cooling and contracting, caused pressure imbalance, and siphoning off heated fluid into the run-around loop. In particular run-around systems were not required to be compatible with combination heating systems, or what are known as open systems. Open systems are opened to the domestic potable water system. In addition, open systems are continually replenishing their operating fluid with new potable water, which is full of dissolved air, nitrogen, and oxygen. Applicant has conducted tests with clear tube, and with the injection of food coloring , so as view the actions within the run-around system. It was found that the runaround loops were very susceptible to pressure changes, caused by the actions of the domestic plumbing system. These disturbances can be caused by the use of high water use fixtures, such as showers, hot tubs, sprinkler systems, high water use appliances, booster pumps, or sticking or slow acting water pressure regulator valves, etc. In addition closed hydronic systems have many internal disturbances caused by injection pumps, boiler reset, and valve operations, etc. The instant invention check valve buffer acts to stop the rapid boiling of the loop fluid, and also greatly reduces the siphoning effect of rapidly cooling, and contracting hot fluids, that have been injected into the run-around loop system. The use of the check valve buffer in combination with other elements, eliminates the problem of free air bubbles in the run-around loop system. This allows the air conditioning system to run as designed, continually with reduced failure, and eliminates the need to dispatch a service technician to the site to reestablish operation of the run-around loop. This constant service problem may be very costly to the system owner, and may be one of he main reasons that this recuperative technology has not been used more to enhance moisture removal and reduce energy consumption in modern air conditioning systems.

Precool coil bypass valve. When installed in its prescribed position, this valve functions to moderate the capacity of the run-around loop, or bypass waste heat off the reheat coil around the precool coil and then directly back to the heat source. This function of directing the waste heat around the precool coil is very important. This action prevents the return air supply from being heated and allows many modes of operation to occur efficiently with reduced failure, such as, when a system has

the need to inject additional outside reheat into the runaround loop, or when a heat pump operates in either second stage heat or defrost mode. Due to the function of the precool coil bypass valve, the instant invention new combination is compatible with many different heating and air conditioning systems, such as, two stage hydronic heating systems, run-around reheat systems, and dual fuel heat pump systems. The fact that the new combination is compatible with heat pumps is particularly useful, because heat pumps are very efficient for heating structures at outside ambient temperatures from 60 degrees to 38 degrees Fahrenheit. Heat pumps are used quite frequently in the southern United States due to their moderate damp winters and hot humid summer climates, which require enhanced dehumidification. The new combination was designed to be used in climates with wet bulb temperatures of approximately 73 degrees or higher. All of these functions can be accomplished with this new unique combination. In addition, another problem solved by the function of the precool coil bypass valve may be that in light commercial or residential equipment, operating with two stages of heat, where the fan motor would needs to be installed in a position where the motor and drive would not overheat due to heat from the precool coil. This is due to the fact that smaller systems generally use direct drive fans with the motor and drive in the air stream. The cost and availability of high temperature motors in this range may be extremely expensive. These fan and motor combinations also need to be positioned at the outlet of the cooling coil for proper and efficient operation when in the dehumidification mode. This function of the precool coil bypass valve allows the new combination to be compatible with heating fluid supply temperatures of 140 degrees to 180 degrees Fahrenheit. This allows for proper compatibility in many climates and heating system configurations. The position and function of the precool coil bypass valve, allows the new combination much broader system compatibility, with predictable, stable, efficient, and reliable function, not possible with other old known combinations.

If the check valve buffer, precool coil bypass valve, and combination purge, balance, and bubble scrubber are removed from the new combination system, these remaining elements by themselves would simply be an aggregation because there would be no cooperation between these

elements. When the check valve buffer, per cool coil bypass valve, and combination purge, balance, and bubble scrubber are combined in their specific positions with other elements there is complete co-action between all elements. There is then a new combination not disclosed before with new unexpected results such as described in the enclosures A through D.

For all of these reasons it is believed claim 1 is distinguished from the cited art and should be allowed.

Regarding claims 5 and 6, these claims are dependent on what is now believed to be an allowable base claim and therefore should be allowed.

The Abstract has been amended to correct a mistyped sentence. Paragraph [0003] and [0004] have been amended to correct wording and spelling. Paragraphs [0017] and [0020] have been amended to correct wording and remove incorrect sentences.

Claims 2, 16 and 22 have been amended to agree with the disclosure at page 7, line 28 (paragraph [0020].

Claims 6, 19 and 22 have been amended to remove the word "hot" as the fluid may not be hot as disclosed.

Claims 16 through 26 have been allowed.

Claims 1 through 4 and 7 through 15 have been objected to as being dependant on a rejected base claim, but would be allowable if rewritten. The base claim is now believed to be allowable.

It is believed with the clarifying amendments that the uniqueness of the instant invention is not disclosed in the cited art. While various methods have been tried in the past, air conditioning systems such as the present invention did not perform as presented in the remarks. There has been a long felt need for a solution to this problem.

Accordingly it is believed that the rejections under 35 USC Section 102(b) have been overcome by the remarks, and withdrawal thereof is respectfully requested.

In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration of the cause for rejections and objections is requested. Allowance of claims 1

through 26 is earnestly solicited.

No additional fee for claims is seen to be required. An extension is requested under 37 CFR § 1.17(a)(1) for one month to January 20, 2005 for a fee of $60.00.

If you have any questions do not hesitate to contact me.

Very truly yours,

DENNIS W. BEECH
Reg. No.: 35,443

DWB/ab

Attachments: 1 Page New Abstract Sheet
15 Pages Enclosures A through D

A

As shown in an old combination when in bypass, or single stage heat application, the inter-stage or fan section temperature could be too high for proper / safe motor operation, and therefore would not pass a UL, or equivalent inspection. In our combination we show a bypass of the pre cool coil giving our design a 40% - 60% split from two stages of heat to one stage of heat, without adversely affecting motor and drive components. This combination allows the use of standard motors and drives. When in full heat mode the inter-stage will not overheat because of the use of waste heat only being supplied to the pre cool coil.

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DEVAULT, PA 19432
(800) 872-2645
(610) 296-9668

A

Version : 9.00
Customer :
Project :
Date : 11/26/2004
Item :

COIL CONSTRUCTION

USA Model No. : HW38-BK-02525-X

Type of Coil	:	Hot Water			
Fin Height x Fin Length	:	25.00	In.	x	25.00 Inches
Rows Deep x Fins / Inch	:	2	Rows	x	10 Fins Per Inch
Tube Od and Thickness	:	3/8	In.	x	.014 Wall
Fin Thick. and Material	:	.0045	Corrugated Aluminum Fins		
Face Area	:	4.34	Square Feet		

AIR SIDE PERFORMANCE

Flow, ACFM	:	1200	ACFM
Entering Air Dry Bulb	:	75.00	°F
Entering Air Wet Bulb	:	N/A	
Leaving Air Dry Bulb	:	114.57	°F
Leaving Air Wet Bulb	:	N/A	
Face Velocity	:	276.48	SFPM
Air Side Pressure Drop	:	0.04	In. W.G.

LIQUID SIDE PERFORMANCE

Entering Water Temp	:	160.00	°F
Leaving Water Temp	:	140.00	°F
Number of Circuits	:	5	
GPM	:	5.00	
Water Pressure Drop	:	4.03	FT H
Liquid Velocity	:	3.04	FPS

Total Btuh : 49090.59 BTU/HR.

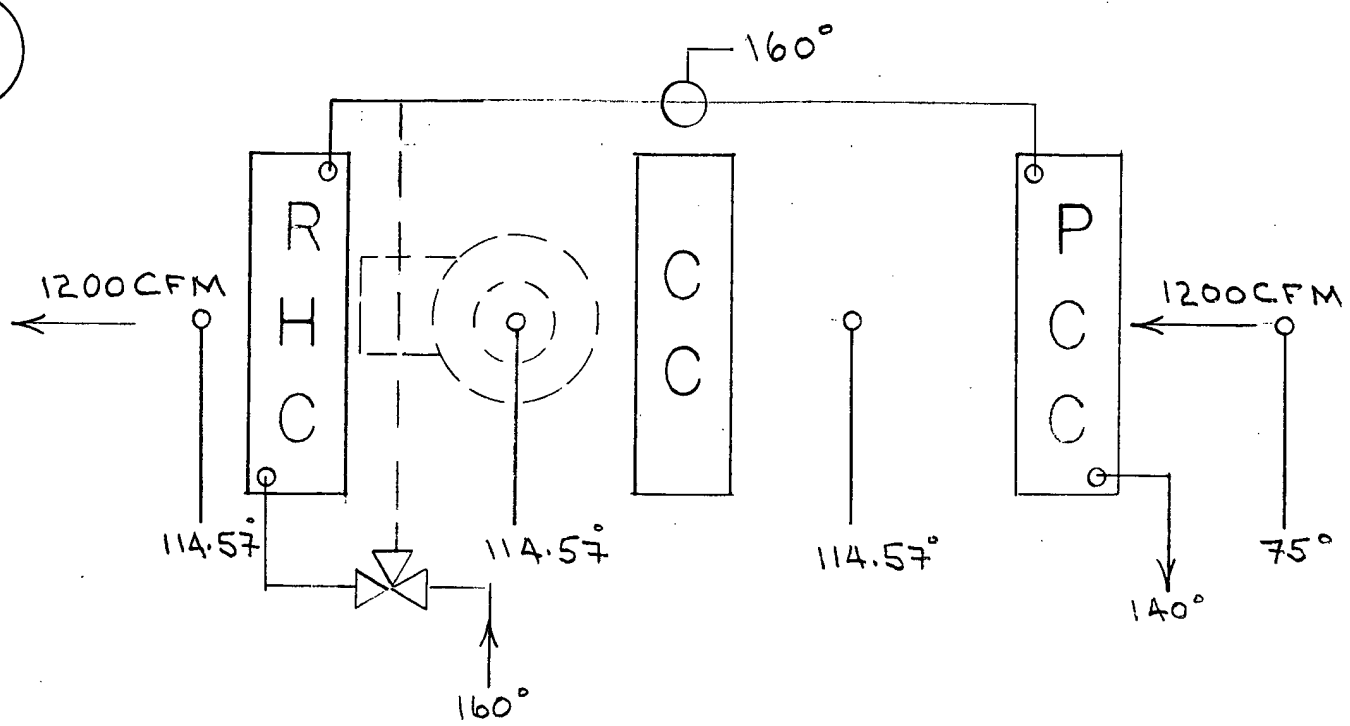
NO. OF COILS PER SYSTEM: ____ ____ HIGH X ____ WIDE X ____ DEEP

If more than (1) Coil in system Performance shown above is based on (1) individual coil.

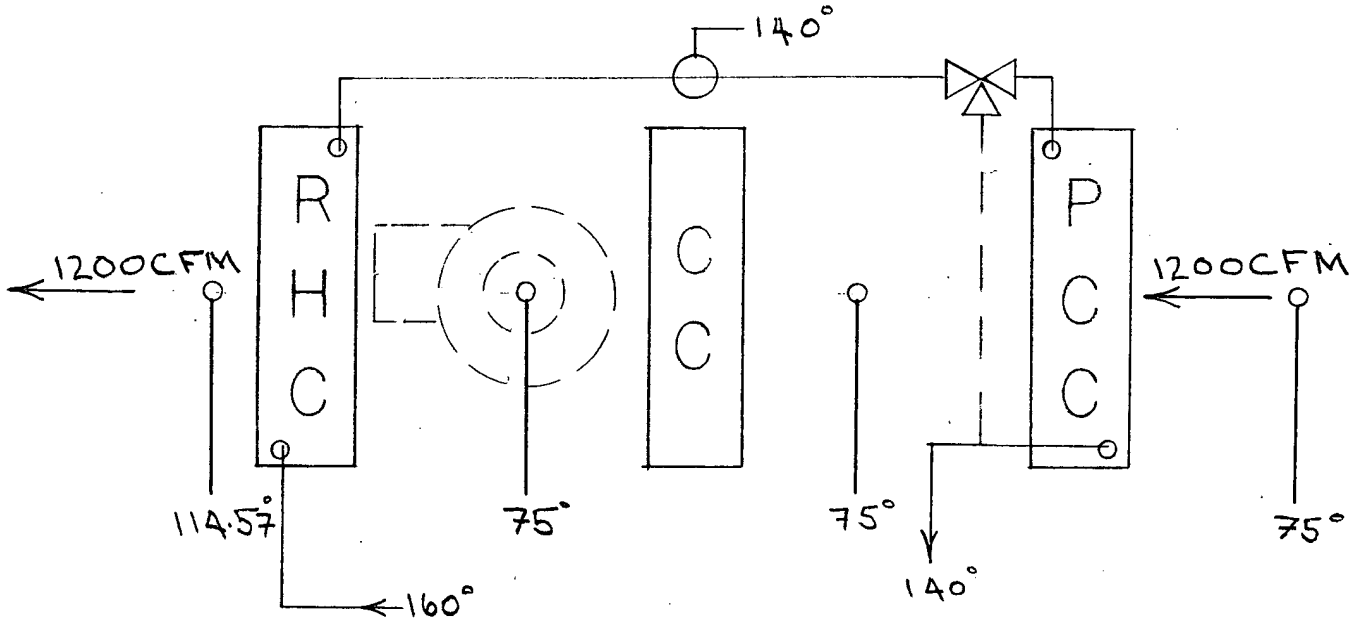
Ratings outside the scope of the ARI Air-Cooling and Air-Heating Coils Certification Program.

OLD COMBINATION SHOWS OVERHEAT OF FAN SECTION

A



OUR NEW COMBINATION SHOWS NO OVERHEAT OF FAN SECTION



A similar situation would exist in known old combinations, with a heat pump, operating in second stage heat application, whereas the indoor coil would overheat due to waste heat off the reheat coil entering the pre cool coil and then, over heating the return air supply to the indoor condenser coil, causing the heat pump to cycle off on its high pressure safety control. The pre cool coil by pass valve in its designated position prevents this condition.

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B

Version : 9.00
Customer :
Project :
Date : 10/29/2004
Item :

COIL CONSTRUCTION

USA Model No. : HW38-BK-02525-X

Type of Coil	:	Hot Water		
Fin Height x Fin Length	:	25.00	In. x	25.00 Inches
Rows Deep x Fins / Inch	:	2	Rows x	10 Fins Per Inch
Tube Od and Thickness	:	3/8	In. x	.014 Wall
Fin Thick. and Material	:	.0045	Corrugated Aluminum Fins	
Face Area	:	4.34	Square Feet	

AIR SIDE PERFORMANCE

Flow, ACFM	:	1200	ACFM
Entering Air Dry Bulb	:	93.00	°F
Entering Air Wet Bulb	:	N/A	
Leaving Air Dry Bulb	:	115.29	°F
Leaving Air Wet Bulb	:	N/A	
Face Velocity	:	276.48	SFPM
Air Side Pressure Drop	:	0.04	In. W.G.

LIQUID SIDE PERFORMANCE

Entering Water Temp	:	140.00	°F
Leaving Water Temp	:	128.93	°F
Number of Circuits	:	5	
GPM	:	5.00	
Water Pressure Drop	:	4.19	FT H
Liquid Velocity	:	3.04	FPS

Total Btuh : 27292.31 BTU/HR.

NO. OF COILS PER SYSTEM: ____ ____ HIGH X ____ WIDE X ____ DEEP

If more than (1) Coil in system Performance shown above is based on (1) individual coil.

Ratings outside the scope of the ARI Air-Cooling and Air-Heating Coils Certification Program.

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B

Version : 9.00
Customer :
Project :
Date : 10/29/2004
Item :

COIL CONSTRUCTION

USA Model No. : HW38-BK-02525-X

Type of Coil	:	Hot Water	
Fin Height x Fin Length	:	25.00	In. x 25.00 Inches
Rows Deep x Fins / Inch	:	2	Rows x 10 Fins Per Inch
Tube Od and Thickness	:	3/8	In. x .014 Wall
Fin Thick. and Material	:	.0045	Corrugated Aluminum Fins
Face Area	:	4.34	Square Feet

AIR SIDE PERFORMANCE

Flow, ACFM	:	1200	ACFM
Entering Air Dry Bulb	:	75.00	°F
Entering Air Wet Bulb	:	N/A	
Leaving Air Dry Bulb	:	99.97	°F
Leaving Air Wet Bulb	:	N/A	
Face Velocity	:	276.48	SFPM
Air Side Pressure Drop	:	0.04	In. W.G.

Total Btuh : 31389.43 BTU/HR.

LIQUID SIDE PERFORMANCE

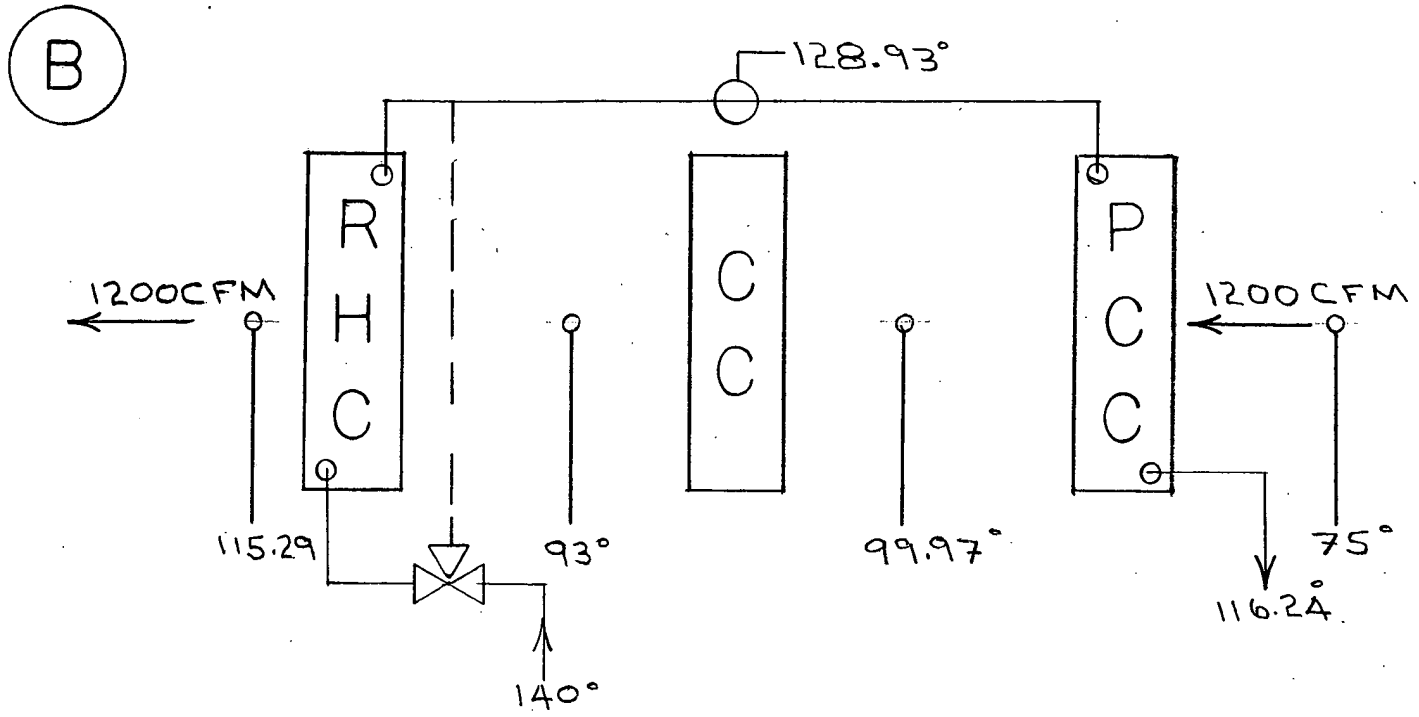
Entering Water Temp	:	128.93	°F
Leaving Water Temp	:	116.24	°F
Number of Circuits	:	5	
GPM	:	5.00	
Water Pressure Drop	:	4.29	FT H
Liquid Velocity	:	3.04	FPS

NO. OF COILS PER SYSTEM: ____ ____ HIGH X ____ WIDE X ____ DEEP

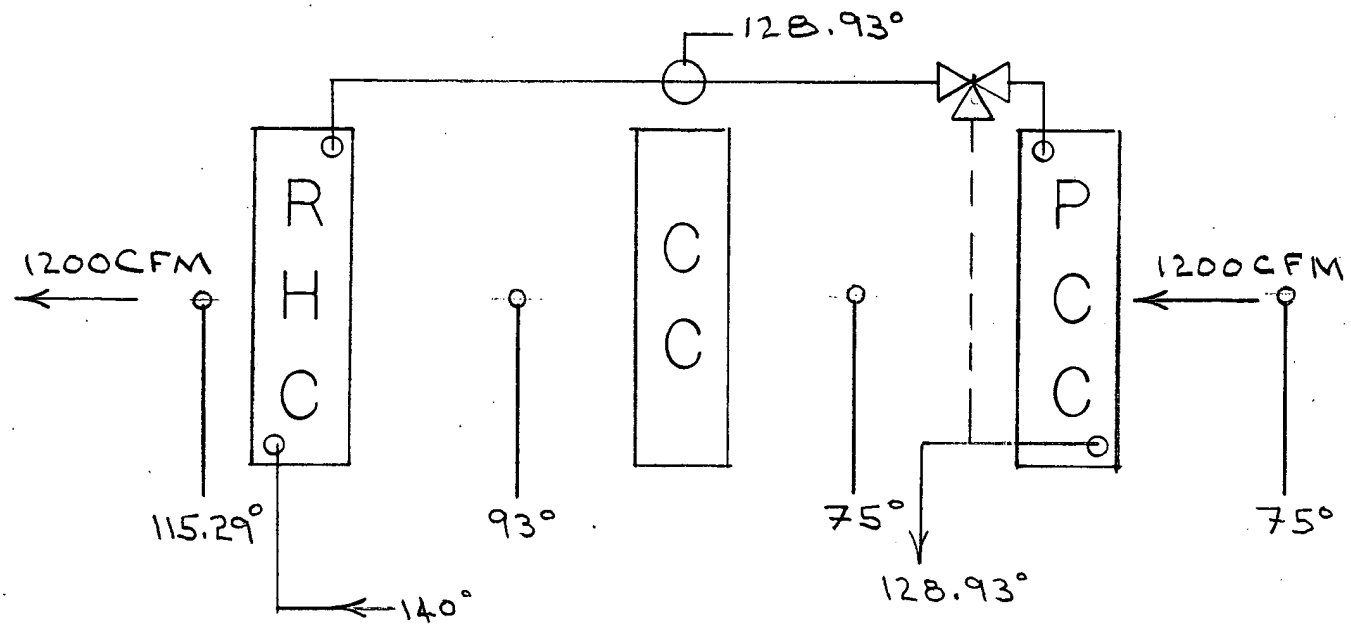
If more than (1) Coil in system Performance shown above is based on (1) individual coil.

Ratings outside the scope of the ARI Air-Cooling and Air-Heating Coils Certification Program.

OLD COMBINATION HEAT PUMP / SECOND STAGE HEAT



OUR NEW COMBINATION HEAT PUMP / SECOND STAGE HEAT



C

Still another similar condition can occur in known old combinations, when a heat pump is in the defrost mode, due in part to the thermal dissipation lag of the outdoor coil, due to the insulating affect of ice on the outdoor coil, and excess waste heat off the pre cool coil. Thus causing the system to overheat, and cycle off on its high pressure safety control.

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C

Version : 9.00
Customer :
Project :
Date : 10/29/2004
Item :

USA Model No. : HW38-BK-02525-X

COIL CONSTRUCTION

Type of Coil	:	Hot Water	
Fin Height x Fin Length	:	25.00	In. x 25.00 Inches
Rows Deep x Fins / Inch	:	2	Rows x 10 Fins Per Inch
Tube Od and Thickness	:	3/8	In. x .014 Wall
Fin Thick. and Material	:	.0045	Corrugated Aluminum Fins
Face Area	:	4.34	Square Feet

AIR SIDE PERFORMANCE

Flow, ACFM	:	1200	ACFM
Entering Air Dry Bulb	:	54.00	°F
Entering Air Wet Bulb	:	N/A	
Leaving Air Dry Bulb	:	92.78	°F
Leaving Air Wet Bulb	:	N/A	
Face Velocity	:	276.48	SFPM
Air Side Pressure Drop	:	0.04	In. W.G.

Total Btuh : 49932.37 BTU/HR.

LIQUID SIDE PERFORMANCE

Entering Water Temp	:	140.00 °F
Leaving Water Temp	:	119.77 °F
Number of Circuits	:	5
GPM	:	5.00
Water Pressure Drop	:	4.19 FT H
Liquid Velocity	:	3.04 FPS

NO. OF COILS PER SYSTEM: ____ ____ HIGH X ____ WIDE X ____ DEEP

If more than (1) Coil in system Performance shown above is based on (1) individual coil.

Ratings outside the scope of the ARI Air-Cooling and Air-Heating Coils Certification Program.

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Version : 9.00
Customer :
Project :
Date : 10/29/2004
Item :

COIL CONSTRUCTION

USA Model No. : HW38-BK-02525-X

Type of Coil	:	Hot Water	
Fin Height x Fin Length	:	25.00	In. x 25.00 Inches
Rows Deep x Fins / Inch	:	2	Rows x 10 Fins Per Inch
Tube Od and Thickness	:	3/8	In. x .014 Wall
Fin Thick. and Material	:	.0045	Corrugated Aluminum Fins
Face Area	:	4.34	Square Feet

AIR SIDE PERFORMANCE

Flow, ACFM	:	1200	ACFM
Entering Air Dry Bulb	:	72.00	°F
Entering Air Wet Bulb	:	N/A	
Leaving Air Dry Bulb	:	93.99	°F
Leaving Air Wet Bulb	:	N/A	
Face Velocity	:	276.48	SFPM
Air Side Pressure Drop	:	0.04	In. W.G.

LIQUID SIDE PERFORMANCE

Entering Water Temp	:	119.77 °F
Leaving Water Temp	:	108.53 °F
Number of Circuits	:	5
GPM	:	5.00
Water Pressure Drop	:	4.38 FT H
Liquid Velocity	:	3.04 FPS

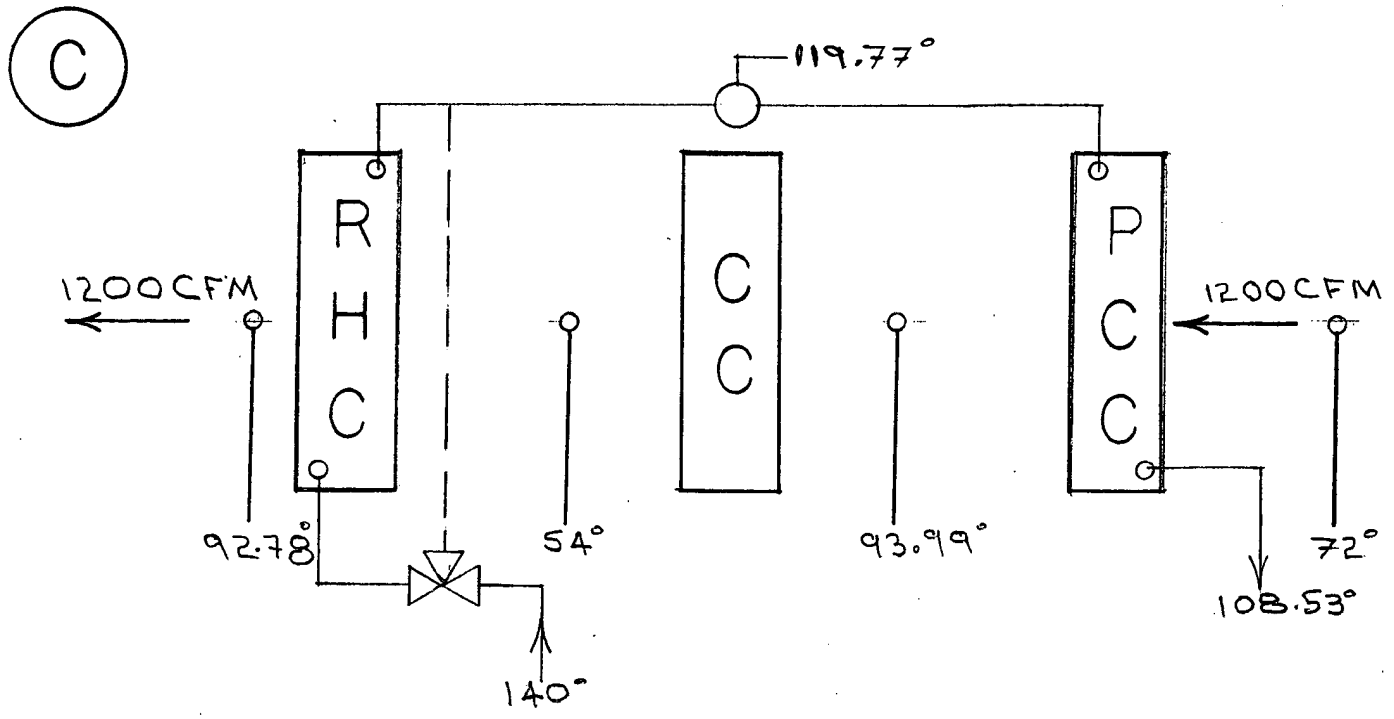
Total Btuh : 27857.72 BTU/HR.

NO. OF COILS PER SYSTEM: ____ ____ HIGH X ____ WIDE X ____ DEEP

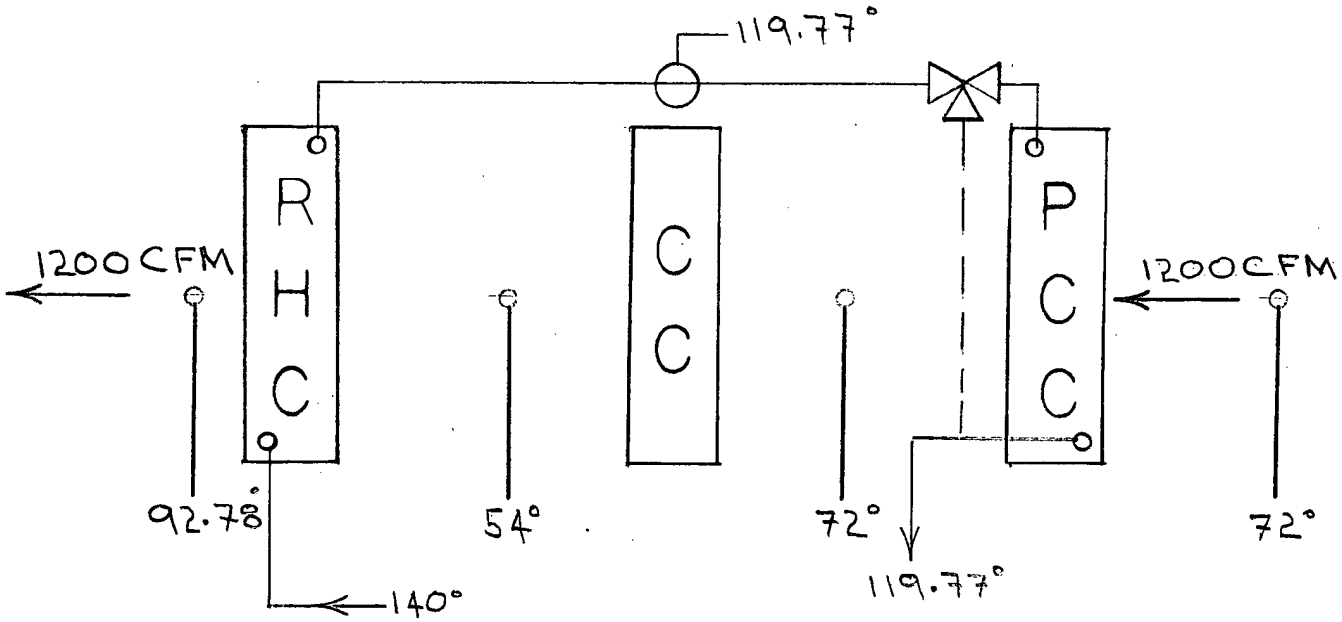
If more than (1) Coil in system Performance shown above is based on (1) individual coil.

Ratings outside the scope of the ARI Air-Cooling and Air-Heating Coils Certification Program.

OLD COMBINATION HEAT PUMP IN DEFROST



OUR NEW COMBINATION HEAT PUMP IN DEFROST



Still another advantage and function, of our combination over old and known combinations would be the fact that when in full reheat, and or neutral air conditions are required by the system. Function of the pre cool coil by pass valve would then preclude the waste heat off the reheat coil from affecting, and or overheating the supply air entering the cooling coil, causing a reduction of dehumidification, reevaporation, and or higher compressor horse power requirements, with associated higher energy use. In addition, when the system moves into independent reheat, or new energy reheat, in certain cases our system can slow down the fan, unload the compressor, therefore requiring much less reheat energy. However, when the air flow is reduced, the heat exchanger coils becomes much larger in proportion to the air mass flow. If not for the proper placement of the pre cool coil bypass valve, this condition would magnify the action of the waste heat, off the reheat coil, over heating the return air, and or fresh air off the pre cool coil, as seen in older known combinations.

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(800) 872-2645
(610) 296-9668

(D)

Version : 9.00
Customer :
Project :
Date : 11/26/2004
Item :

COIL CONSTRUCTION

USA Model No. : HW38-BK-02525-X

Type of Coil	:	Hot Water	
Fin Height x Fin Length	:	25.00	In. x 25.00 Inches
Rows Deep x Fins / Inch	:	2	Rows x 10 Fins Per Inch
Tube Od and Thickness	:	3/8	In. x .014 Wall
Fin Thick. and Material	:	.0045	Corrugated Aluminum Fins
Face Area	:	4.34	Square Feet

AIR SIDE PERFORMANCE

Flow, ACFM	:	1200	ACFM
Entering Air Dry Bulb	:	53.00	°F
Entering Air Wet Bulb	:	N/A	
Leaving Air Dry Bulb	:	74.87	°F
Leaving Air Wet Bulb	:	N/A	
Face Velocity	:	276.48	SFPM
Air Side Pressure Drop	:	0.04	In. W.G.

LIQUID SIDE PERFORMANCE

Entering Water Temp	:	102.00	°F
Leaving Water Temp	:	90.48	°F
Number of Circuits	:	5	
GPM	:	5.00	
Water Pressure Drop	:	4.56	FT H
Liquid Velocity	:	3.04	FPS

Total Btuh : 28665.55 BTU/HR.

NO. OF COILS PER SYSTEM: ____ ____ HIGH X ____ WIDE X ____ DEEP

If more than (1) Coil in system Performance shown above is based on (1) individual coil.

Ratings outside the scope of the ARI Air-Cooling and Air-Heating Coils Certification Program.

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D

Version : 9.00
Customer :
Project :
Date : 11/26/2004
Item :

COIL CONSTRUCTION

USA Model No. : HW38-BK-02525-X

Type of Coil	:	Hot Water	
Fin Height x Fin Length	:	25.00	In. x 25.00 Inches
Rows Deep x Fins / Inch	:	2	Rows x 10 Fins Per Inch
Tube Od and Thickness	:	3/8	In. x .014 Wall
Fin Thick. and Material	:	.0045	Corrugated Aluminum Fins
Face Area	:	4.34	Square Feet

AIR SIDE PERFORMANCE

Flow, ACFM	:	1200	ACFM
Entering Air Dry Bulb	:	75.00	°F
Entering Air Wet Bulb	:	N/A	
Leaving Air Dry Bulb	:	82.10	°F
Leaving Air Wet Bulb	:	N/A	
Face Velocity	:	276.48	SFPM
Air Side Pressure Drop	:	0.04	In. W.G.

LIQUID SIDE PERFORMANCE

Entering Water Temp	:	90.48	°F
Leaving Water Temp	:	86.84	°F
Number of Circuits	:	5	
GPM	:	5.00	
Water Pressure Drop	:	4.69	FT H
Liquid Velocity	:	3.04	FPS

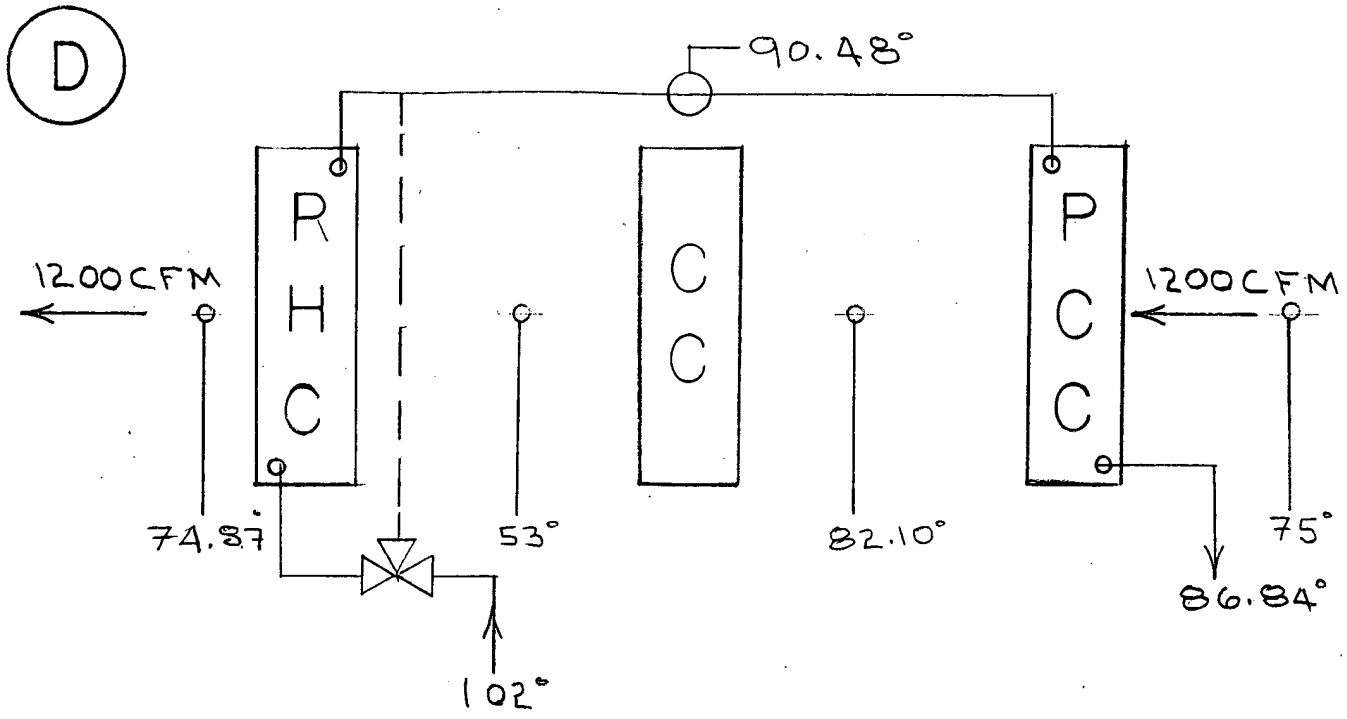
Total Btuh : 9071.26 BTU/HR.

NO. OF COILS PER SYSTEM: ____ ____ HIGH X ____ WIDE X ____ DEEP

If more than (1) Coil in system Performance shown above is based on (1) individual coil.

Ratings outside the scope of the ARI Air-Cooling and Air-Heating Coils Certification Program.

OLD COMBINATION CONTROLLING FOR NEUTRAL AIR



OUR NEW COMBINATION CONTROLLING FOR NEUTRAL AIR